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ABSTRACT

A study by Brown and Fraser (1963) shows that children tend to use telegraphic speech, employing content and omitting function words. This limitation involves the grammatical or semantic complexity of the sentences. Braine (1963) attempted to formulate productive rules for the initial stages in the acquisition of syntax by identifying two classes of words: pivots and X-words. Schlesinger (1971) describes semantic structure as beginning with the speaker's intention to express something. This intention is preverbal, composed of conceptions and relations rather than morphemes or words. O'Donnell (1974) approaches child grammar through an adult grammar capable of describing both semantic and syntactic structure. Incorporating the ideas drawn from previous studies, he believes the differences between child and adult language can be accounted for by both the cognitive differences and the lack of development of the expressive component. It is concluded that recognition of the fundamental importance of role in descriptions of semantic structures can make possible further movement toward a satisfactory grammar of child language. (TS)

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TOWARD A GRAMMAR OF CHILD LANGUAGE

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During the past decade a great deal of attention has been given to the structure of child language, and attempts have been made to formulate grammatical rules to account for the utterances produced by young children.

In a study involving six children, two and three year-olds, who were asked to imitate thirteen simple English sentences, Brown and Fraser (1963) found that the younger children tended to preserve nouns, verbs, adjectives, and pronouns but to omit articles, prepositions, copular be, and auxiliary verbs. They also tended to omit inflectional endings of words. Increasing age was accompanied by increasing use of the elements at first omitted. It was noted that the spontaneous utterances of young children were characterized by the same kinds of omissions. Since an economizing adult follows a similar pattern in composing a telegram, Brown and Fraser referred to the language of children at this stage of development as telegraphic speech.

The results can be stated in terms of the distinction some linguists make between content words and function words, or contentives and functors. In their attempts to imitate the model sentences, the children omitted most of the functors and retained the contentives. Since sequential order has grammatical significance in English, it was possible for observers to make generalizations about the grammar of the children's utterances.

Brown and Bellugi (1964), reporting on the early sentences of two of the children in their longitudinal study, confirmed the telegraphic characterization of both imitations and spontaneous utterances. They found definite limits on sentence length and on production of functors; contentive words were produced and normal word order was preserved. Brown and Bellugi rejected memory limitations as an explanation of the kinds of sentences produced and suggested that the real limitation involves the grammatical or semantic complexity of the sentences that can be processed.

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Although Brown and his colleagues were able to make insightful generalizations about the regularities of structure in child language and even to propose rules for two-word sentences, they did not attempt to write a comprehensive set of productive rules for child language.

Braine (1963) attempted to formulate productive rules for the initial stages in the acquisition of syntax. He studied the language of three children, covering the first four months following the start of multi-word utterances. Although there were many single-word utterances and a few of three, four, or five words, most of the combinations were two words long. His generalizations are drawn mainly from observations of one and two-word utterances.

Braine identified two classes of words: pivots and X-words. The pivot class is composed of a small number of words which tend to occur in several word combinations. Each pivot word is associated with a particular utterance position. He defined two subclasses of the pivot class: P_1 was associated with initial position and P_2 with final position. He described the X-class as a large open class containing the child's entire vocabulary except for some of the pivots. Words of the X-class were observed in relatively few word combinations and did not appear to be tied to a particular utterance position; they occurred alone or in position complementary to that of the pivot word. Only one of the children provided evidence for a subdivision of the X-class.

Words in single-word utterances were classified as X-words. Two-word utterances could be composed of P_1 followed by X or of X followed by P_2. The sequence P_1 X was much more frequent than X P_2. Utterances more complex than these were taken to be early examples of constructions belonging to the next developmental phase.

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Miller and Ervin (1964) analyzed utterances produced by two children in weekly 45-minute sessions. They utilized two word classes which they called operators and nonoperators; these two classes are obviously similar to Braine's pivot and X classes. They reported their observation that "A few high frequency words [operators] tended to be restricted to a given position in the sentence and tended to define the meaning of the sentence as a whole. The use of these words marked the first step in developing the grammatical system of the model language."

It was recognized by Miller and Ervin that the difference between operator and nonoperator classes is not absolute. They observed that nonoperator words tend to be grouped into large classes, but that the division between classes is sometimes difficult to make. In spite of the difficulty caused by vacillation of specific items, they believed their method of analysis captured the regularity of child language sufficiently to yield useful information about structure.

The terminology used by the various investigators differs, but there is a remarkable consistency in their analyses. Brown's modifier + noun is similar to Braine's pivot + X and Miller and Ervin's operator + nonoperator, although it is obvious that the latter two systems function more broadly than Brown's.

The following table from McNeill (1970) illustrates the similarity of structures found in independently conducted studies. McNeill uses the terms pivot and open to designate the word classes in the various studies.

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PIVOT AND OPEN CLASSES FROM THREE STUDIES OF CHILD LANGUAGE

Braine		Brown		Ervin	
P	O	P	O	P	O
allgone byebye big more pretty my see night-night hi	boy sock boat fan milk plane shoe vitamins hot Mommy Daddy . . .	my that two a the big green poor wet dirty fresh pretty	Adam Becky boot coat coffee knee man Mommy nut sock stool Tinker Toy . . .	this that	arm baby dolly's pretty yellow come doed . . .
				the a	other baby dolly's pretty yellow . . .
				here there	arm baby dolly's pretty yellow . . .

Commenting on the language of the children represented in the table, McNeill (1970, p. 26) says ". . . sentences consisted of a word from the list on the left followed by a word from the list on the right--that is P + O. Thus, byebye fan, wet sock and that doed all might have occurred." McNeill noted that not every combination was actually observed, but he saw no differences between the actual and possible combinations and assumed that the gaps arose from sampling limitations.

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McNeill assumed that the children really had organized their vocabularies into classes and that their linguistic competence included the rule:

$$S \dashrightarrow (P) + O.$$

This rule accounts for utterances consisting of a pivot word followed by an open word and for utterances consisting of a single word of the open class. The rule would have to be modified to account for the other observed combinations: O + O and O + P. McNeill assumed that pivots do not occur alone or in combination with one another. He also attempted to show that the development of new classes can be accounted for as differentiation of the pivot class. Thus he developed an argument relating the pivot and open classes to universals of grammar and to adult competence.

Acceptance of the pivot grammar description of child language was further encouraged by Slobin (1969) who concluded from his research in the international literature on child language that pivot and open classes might be a universal feature of early speech. More recently, however, the adequacy of pivot grammar has been challenged by Bloom (1970).

Bloom analyzed language produced by three children and found that a pivot grammar was adequate for the language of only one child. She found pivot-like constructions in samples from all three children but they were not predominant. Several occurrences of noun + noun and noun + verb seemed not to be accounted for by the O + O rule of pivot grammar. For one child a majority of constructions did combine an initial pivot with a subsequent noun. Bloom found the rule $S \dashrightarrow P + N$ applicable to a limited number of utterances. She formulated the more complex rule $S \dashrightarrow$ Nom (Neg) $\left\{\begin{matrix}(NP)\\(VP)\end{matrix}\right\}$, which she found satisfactory for most pivot-like constructions, as well as a number of other constructions.

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The limitations of pivot grammar are illustrated by constructions that are alike in surface characteristics but obviously different in underlying structure. Bloom obtained from one child on two different occasions "Mommy sock." One utterance occurred in the context of the child picking up her mother's sock; the other occurred in the context of the mother putting the child's sock on the child's foot. The pivot grammar representation of both constructions as O+O fails to show that the first indicates the relation of possessor to object possessed and the second shows what might be the subject and object of an adult sentence.

If the referents of two nouns were not related in the child's perception except by their being viewed simultaneously, it seems that the two possible sequential orders of the nouns should be equally probable. But for most N + N constructions they are not interchangeable. When the relation of possessor to thing possessed is suggested by context, the noun referring to the possessor usually comes first. Likewise when the subject-object relation is suggested by context, the subject noun usually comes first. Apparently, the child is able to distinguish the different relations, but pivot grammar is too superficial to account for the distinctions.

Bloom also found evidence of N + N constructions indicating the relation of subject to locative ("Sweater chair"--the child puts her sweater on the chair) and of attributive ("Party hat"--the child picks up a hat worn at parties). Since pivot grammar makes no distinctions among these various N + N constructions, it lacks the capability of accounting for the child's conceptual knowledge. Bloom attempts to formulate additional phrase structure rules which can account for the distinct underlying structures expressed in the children's utterances.

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Although Bloom's grammar follows the Chomsky (1965) model, it allows for what Brown (1973) calls a "rich" interpretation. In calling attention to the limitations of pivot grammar and showing alternatives, Bloom made a major contribution to knowledge about child grammar. However, she did not attempt to discard syntactic deep structure in favor of semantic structure.

Schlesinger (1971) comes closer to a description of semantic structure in his model of the child's sentence production and comprehension, a model which is not based on Chomsky's grammar. According to Schlesinger, psychological generation of a sentence does not begin with anything corresponding directly to the symbol S. It begins rather with the speaker's intention to express something. The germ of the sentence, then, is the part of the speaker's total intention which he means to embody in words. Since this intention is preverbal, it is composed of conceptions and relations rather than morphemes or words. Schlesinger's preverbal representation is an I (input) marker as contrasted with Chomsky's P (phrase) marker. I markers become sentences by means of realization rules. These realization rules determine sequential position and grammatical category of each element in the I marker. Hierarchical structure in sentences can be accounted for by the ordered application of two or more position rules. Transformations of order can be managed by making realization rules conditional. For example, one set of rules is applied when an I marker contains negation and another set when it does not.

The I marker for "John catches the red ball" includes the conceptions indicated by John, catch, red, and ball. It also includes the attributive relation of red to ball, the object relation of the red ball to catches, and the agent relation of John to catches the red ball.

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In Schlesinger's view, the I markers of sentences, concepts, and relations are determined by the cognitive capacity of the child. They are presumed to be universal and innate, but not specifically linguistic nor peculiarly human. The child's language learning is primarily a matter of learning the realization rules of the language in use around him. These rules relate conceptions and assign them to grammatical categories. In the two-word utterances of children, the order of conceptions is generally that of adult expressions but the grammatical categories appear sometimes to be different. Inflections, auxiliaries, and prepositions are usually omitted. Thus, in the developmental sequence of language, order of conceptions comes first, grammatical categorization comes later, and function morphemes come still later.

In the two-word utterances Schlesinger analyzed, he found the following relations expressed: agent and action (Mail come), action and object (See sock), agent and object (Eve lunch), modifier and head (Pretty boat), negation and X (No wash), X and dative (Throw daddy), introducer and X (See boy), and X and locative (Baby highchair).

Brown (1973, P. 114) compares Schlesinger's analysis with Bloom's and points out their major differences:

> Schlesinger's characterization of child speech includes the telegraphic characteristics: inflections, prepositions, auxiliary verbs, and articles are not generated by his realization rules; contentives and certain functors (for example, more, no) are generated and in normal order. His analysis departs from the telegraphic description in that he attributes to the child certain relational semantic intentions. Like Bloom, Schlesinger makes a "rich" interpretation. He differs from Bloom first of all in that he offers a model of production rather than a grammar. This difference does not really go very deep. Schlesinger's model could be made into a grammar of sorts by expanding S as a set of alternative conceptions and relations. This would provide a "deep structure" for sentences that was directly semantic. In addition, a Schlesinger grammar would have a second component--the realization rules--for creating surface structures out of deep

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> structures. Bloom's grammar is of the sort proposed by Chomsky in 1965, in which the deep structure of a sentence is generated by phrase structure rules, a lexicon, and certain rules of lexical selection.

Brown calls attention to the fact that at the time Schlesinger wrote his paper (three or four years before it was published), very few linguists had proposed that the Chomsky type of deep structure be replaced by a directly semantic structure, but since then several, including Fillmore (1968) and McCawley (1968) have done so. According to Brown (1973, p. 115):

> These authors have shown that some decisions affecting the surface form of a sentence, for example, selection of reflexive forms, pronouns, definite and nondefinite articles, are based on meaning rather than grammatical deep structure, and so that there are reasons, beyond those raised by Schlesinger, for making meaning the only deep structure. As yet, however, no one has shown how to write anything approaching a complete grammar of this type.

Brown proceeds to show how certain ideas drawn from Schlesinger, Bloom, Fillmore, and Chafe (1970) can be synthesized to give a more adequate explanation of the grammar of child language, but he does not attempt to write a "complete" grammar. From Chafe, he draws the following list of semantic roles played by noun phrases in simple sentences: agent (Harriet sang), patient (He cut the wood), experiencer (Tom saw the snake), beneficiary (Tom bought Mary a car), instrument (Tom opened the door with a key), location (Tom sat in the chair), and complement (Mary sang a song). From Fillmore, he draws the following list of case concepts: agentive (John opened the door), instrumental (The key opened the door), dative (Adam sees Eve), factitive (John built a table), locative (John walked to school), and objective (John opened the door). Additional case concepts suggested by Fillmore are benefactive (John did it for Mary), comitative (Adam walked home with Mommy), and temporal (They arrived at noon).

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Fillmore uses the term *case* in reference to the various semantic relations, but he does not clearly distinguish the roles of separate entities in case relationships. Both Brown (1973) and Chafe use the term *role*, but neither of them calls specific attention to the precision that can be gained by distinguishing role from relation. O'Donnell (1974) emphasizes this distinction and suggests an approach to grammar that has potential for describing language at various stages of development.

O'Donnell views language as consisting of three related components: a basal component, an operative component, and an expressive component.

> The input for linguistic encoding is identified at the perceptual level. The structured entity at this level can be referred to as an *event*, which is primarily composed of a *process* and one or more *things* in perceived relations to one another . . . . Events are encoded at the basal linguistic level as structured entities which may be referred to as *constructs*. The output at the event level, after appropriate syntactic and phonological elements are added, is the structured entity called the *sentence* (p.5).

The basal component generates constructs, which consist of a modal index and semantic entities related to each other by their respective roles. Constituent semantic entities may also be related in subconstructs, which take roles as constituents of the larger constructs. The modal index indicates how events are viewed, i.e., as actual or potential, continuing or terminated, etc. The operative component assigns syntactic functions (subject, object, etc.) to base constituents and categorizes them as nouns, verbs, adjectives, or adverbs. It also supplies syntactic features (plural, past, etc.), functors (articles, prepositions, copula, etc.), and sequence rules. The expressive component provides phonological features and rules and is viewed broadly enough to account for graphic, gestural, and other forms of linguistic expression.

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O'Donnell's list of role indicators for elements in constructs includes agentive, receptive, attributive, and processive. Role indicators for subconstructs include causal, temporal, and conditional.

The sentence "The child touched the dog" is regarded as having a basal component consisting of a modal index and three constituent elements with their role indicators. The modal index specifies that the event encoded is viewed as actual rather than potential, assertive rather than interrogative, terminated rather than continuing, etc. The constituent elements (represented by CAPITAL letters) are TOUCH, processive role; DOG, receptive role; and CHILD, agentive role. The operative component assigns to TOUCH the function of predicator and categorizes it as a verb. DOG has the direct object function and is categorized as a noun. The subject function and noun category are assigned to CHILD. The operative component also assigns appropriate syntactic features and functors and a sequence rule. The expressive component provides necessary phonological features and rules. The result is the overt sentence.

In "Mother ran when the child touched the dog," the structure described above would be regarded as a subconstruct with temporal role. In the overt sentence it would be the adverbial clause, when the child touched the dog.

The revised and expanded system developed by O'Donnell (forthcoming) incorporates ideas drawn from Schlesinger, Chafe, Fillmore and Brown. It is intended to account for the semantic structures underlying sentences uttered by adults, but it appears to have considerable potential for explaining the grammar of child language. As a matter of fact, it may be found that the best approach to child grammar is through an adult grammar capable of describing both semantic and syntactic structure. If semantic structure is more basic than syntactic structure (as it appears to be), it probably is learned earlier

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than syntactic structure. Furthermore, the learning of syntax may be no more and no less than learning a systematic means of processing semantic elements for overt expression. In O'Donnell's system, role identification is regarded as basic to semantic structure, and it may be the basic point of contact between semantics and syntax.

Some points of semantic structure in O'Donnell's forthcoming work are outlined as follows:

I. A semantic construct may encode a state or an event.

A. A state consists of:

1. an object and its attribute (The ball is pretty)
2. an object and its classification (The ball is a toy)
3. an object and its nomination (The thing is a ball)
4. an object and its possessor (The ball is Joey's)

B. An event consists of:

1. A process and a patient (The baby grew) or
   A process, a patient, and an object (The baby heard a noise)
2. An action and an agent (The baby crawled)
3. A transaction, a patient, and an agent (Mother bathed the baby); instrument (with a cloth), location (in the kitchen), and time (this morning) may also be included

II. A semantic subconstruct has a role which specifies its relation to the larger construct of which it is a part.

Generative rules for semantic structures can be stated in terms of role indicators. The rule for a construct encoding a state might be represented as follows:

$$\text{State} \longrightarrow \left\{ \begin{array}{l} \text{Attribute} \\ \text{Classification} \\ \text{Nomination} \\ \text{Possessor} \end{array} \right\} + \text{Object}$$

For "The ball is pretty" semantic entities corresponding to ball (BALL) and pretty (PRETTY) would be constituent elements in base structure. BALL would have object role and PRETTY would have attribute role. Modal index would specify that the state is perceived as actual rather than potential and that the intention is assertive rather than interrogative. In the operative component BALL would be assigned subject function and categorized as a noun with singular number and definite article. PRETTY would be assigned predicative function and categorized as an adjective. The functor be with present tense and third person singular agreement features would be supplied. The sequence rule would place the subject before the predicative. In the expressive component appropriate phonological features would be supplied to produce the audible utterance.

For a child at the two-word sentence stage, most of the operative component would be bypassed and the resulting sentence would be "Pretty ball." Thus, the telegraphic nature of child language at the early stages could be explained by the fact that the child's operative component is undeveloped (or at least not fully developed). Conceivably, at the beginning of the two-word stage, the child may have no concept of grammatical subject and predicate and no clear concept of noun and verb. On the other hand, it is unlikely that the child could function linguistically without the concepts of state and event, and of semantic entities related to one another by distinctive roles. This is not to say that the child perceives the external world the same way the adult does, nor that he perceives all the related entities in an event. The child's perception is probably limited by his experience and stage of cognitive development. This lack of correspondence between child and adult perception may account for some of the child's linguistic aberrations. At the same time,it is unlikely that all

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of the differences between child and adult language can be accounted for by cognitive differences. In the holophrastic stage, for example, there is strong circumstantial evidence that the child perceives related entities in states and events, although he is able to express no more than one sematic entity in an utterance. It may be that much of the difficulty lies in the lack of development of the expressive component. Whatever the reason may be, if the child can only pronounce one word in an utterance, he apparently selects the one whose role seems most prominent and important to him. For example, at the single-word stage "Pretty" might mean the same thing as "Pretty ball" or "The ball is pretty" if the child is holding or pointing at the ball as he says the word.

The generative rule stated on page 12 would also account for the other examples of states illustrated in the outline. "The ball is Joey's" would take features and functors in the operative component corresponding to the, is, and 's, and the sequence rule would place the subject before the predicate. Again, the child's "Joey ball" would represent an utterance minimally affected by the operative component. On the other hand, the construct underlying "The thing is a ball" might still be expressed by a child capable of two-word utterances simply as "Ball." The situational context might lead him to suppress all elements perceived as sufficiently obvious for comprehension on the part of his hearer.

The generative rule for constructs encoding events would necessarily be more complex than the rule for states. It would specify an option among the process, action, and transaction roles. An element with process role would be accompanied by an element with patient role and might include one with object role. An element with action role would be accompanied by one with agent role.

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An element with transactive role would be accompanied by elements with patient and agent roles, respectively; it might also be accompanied by an element with the role of instrument. Elements with roles of time and location are optional in constructs encoding events.

Assuming that the child's linguistic development reflects (and follows) the pattern of his cognitive development, one can hardly refuse to recognize the primacy of semantic structure in child language. Since a structure consists of related parts and the relations can best be described by referring to the role of each part in the structure, role indicators are of fundamental significance in formulating rules to account for semantic structures. An adequate list of semantic roles would provide the grammarian a point of contact between semantic structure and syntactic structure and enable him to systematically explain how the same semantic construct can take various syntactic forms. It seems that the child's perception of semantic role is prerequisite to his further linguistic development and that the perceived roles of semantic elements provide a stable point of reference as the child learns syntactic rules.

Progress towards an adequate explanation of child grammar has been facilitated by a growing recognition of the importance of semantic structure. Recognition of the fundamental importance of role in descriptions of semantic structures can make possible further movement toward a satisfactory grammar of child language.

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